

CLINICAL CASE

ANKLE FRACTURE ASSOCIATED WITH A TILLAUX FRACTURE IN ADULTS - A CASE REPORT

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ABSTRACT

We report a particular case of a rare lesion association of ankle fracture occurring after an open trauma of the right ankle, and which associates a bimalleolar fracture, a Tillaux fracture and an interposition of the posterior tibial tendon in syndesmosis. We treated it surgically with a good clinical and radiological evolution. The objective of this study is to draw attention to this clinical and radiological variety.

KEY WORDS: Bimalleolar; Tillaux; Fracture; Posterior Tibial Tendon; Interposition; Syndesmosis.

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INTRODUCTION

The ankle is a tightly knit joint, which is subjected to significant mechanical stresses as a distal articulation of the lower limb. Malleolar fractures are commonly encountered in common orthopedic surgery, they are generally secondary to a high energy trauma; but, the fracture of tillaux tubercle in adults is very rare [1] It is accompanied with a detachment of the anterior tibio-fibular ligament, which is posteriorly responsible for a lower tibio-fibular instability [2]. This pathological entity corresponds to an epiphyseal detachment stage 3 in children according to Salter and Harris [3,4]. However, its association with an ankle dislocation fracture with interposition of the posterior tibial tendon remains exceptional. The objective of our work is to report a case that illustrates this very rare pathological entity, common between the child and the adult. Through this study, we will give a general presentation and our personal experience with a general review of the literature, emphasizing on the interest of early treatment with a stable internal fixation in order to obtain a stable, painless, mobile ankle with satisfactory functional results.

CASES REPORT

Mr. G.M, aged 48, with no significant pathological antecedent, a worker by profession, autonomous before

the trauma. He was the victim of a road accident. Riding a motorcycle, he was hit by a car with a direct impact on the right ankle. At admission, the clinical examination showed that he was hemodynamically stable with no neurological or associated spinal signs. The examination of the musculoskeletal system revealed a distorted ankle with varus deformity of the foot, a cutaneous exit opening, with the internal malleolus exposed and a distal 1/3 of the tibia on its internal surface. The cutaneous opening is about 7 cm, stage 2 according to the Cuchoix and Duparc classification, associated with a posterolateral subluxation of the foot which is visible (Figure 1). The vascular and neurological evaluation of the foot did not find any detectable lesion. The initial radiological assessment showed an ankle dislocation fracture involving a fracture of the supra-ligamentary external malleolus, the internal malleolus and a fracture of the Tillaux tubercle with a postero-lateral dislocation of the foot (Figure 2). The patient initially received medical treatment with analgesic measures and an immobilization of the foot by a simple posterior brace in boot.

OPERATING TECHNIQUE

We performed an orthopedic reduction of the dislocation with surgical wound excision and a bi-antibiotic coverage based on aminoglycoside and protected amoxicillin

(Figure 3-4). Our therapeutic behavior at this stage consisted of surgical abstention for 7 days, in particular doing no internal osteosynthesis for awhile to evaluate the infectious risk and the cutaneous state and to discuss a formal indication to an ankle fixation by external fixator (Figure 3). The patient was taken back on the 7th day of his hospitalization in a programmed surgery after being sure of the absence of infection signs and skin suffering.



Figure 1: Cutaneous opening, stage 2 of Cuchoix and Duparc, associated with a postero-lateral subluxation of the foot that is visible.



Figure 2: Ankle radiography showing a fracture dislocation of the ankle involving an external bimalleolar fracture and a fracture of Tillaux tuber (tubercule).

The surgical procedure was carried out under locoregional anesthesia and pneumatic tourniquet at the root of the limb. Under spinal anesthesia, 2 g of protected amoxicillin was administered to the patient as a dose of antibio-prophylaxis. The patient was placed on the ordinary table in supine position, and having a block under the homolateral buttock so as to neutralize the external rotation of the foot and to well expose the external face of the ankle. An external incision of 7 cm, centered on the fibula, made it possible to approach the fracture after a thorough dissection of the subcutaneous and aponeurotic tissues with hemostasis. The opening of the periosteum revealed a fracture of the external supraligament malleolus with an oblique short line. The reduction of the fracture was simple and manual maintained by a reduction forceps.

The osteosynthesis was performed by placing a special screwed plate fibula 6 holes (3.5mm). By the same

external approach in combination with the internal approach of the wound, we performed a manual reduction and fixation of fragments of the Tillaux tubercle fracture by using a 4 / 35mm screw.



Figure 3: Clinical evaluation (dermal and infectious risk), on the 3rd post-traumatic day.



Figure 4: Radiological control after orthopedic reduction of the dislocation, with a surgical wound excision.



Figure 5: standard radiography of immediate control after internal stabilization of ankle joint fractures.

Then, through an internal approach of the ankle made by the exit opening, a thorough subcutaneous dissection and the aponeurotic level, which allow to gain the internal

malleolus, were carried out with a median pedicle exploration which was intact. This allowed us to discover a transverse fracture of the internal malleolus which was reduced and stabilized by the placement of an anti-rotatory spindle and a 4 / 30mm malleolar screw.

The control of the reduction of the bimalleolar forceps under an intensifier screen noted the persistence of ligamentous joint (syndesmosis) rupture which was irreducible by external maneuver. The etiological research found an interposition of the posterior tibial tendon in the syndesmosis, which was identified as the cause of the subluxation after the anatomical reduction of the posterior tibial tendon. To note that the complementary stabilization was made by placing a syndesmosis screw (Figure 5), which was ablated at 6 weeks postoperatively. The closure of the aponeurotic level and the subcutaneous and cutaneous levels were performed by using a 2-0 vicryl thread, and the skin closure was performed by using nylon 3-0 thread after an abundant saline wash and using injectable prophylactic antibiotic for 72 hours, and analgesic treatment based on paracetamol, codeine and thromboprophylaxis for 30 days.

Standing and supporting was forbidden for 45 days with immobilization by a posterior splint. The patient was seen at D + 15 (after two weeks) postoperatively, with a good clinical progression including pain regression and absence of signs of dehiscence or infection of the operated wound. After the ablation of syndesmosis screw, the patient was seen 2 months later, with a good clinical and radiological evolution. Soft reeducation was prescribed with contact support (standing) (less than 5 kg).

DISCUSSION

The ankle is a very tight joint, it is subjected to enormous mechanical stresses, and any post-traumatic anomaly of this articular surface probably leads to post-traumatic osteoarthritis. Traumatic ankle pathology is common in daily emergencies. Malleolar fractures are commonly encountered in orthopedic surgery, they are usually secondary to a high energy trauma. The complex anatomy of this region and the occurrence of lesions during a polytrauma can lead to their misunderstanding, except in deceptive clinical settings (presentations), which aggravates the functional prognosis. The diagnosis of ankle lesions is based on a good anatomical knowledge of the bone and ligament lesions and their associations, as well as a good radiological analysis; however, it sometimes requires the use of complementary imaging methods such as ultrasound and CT.

Syndesmosis is a union of two bony parts which form the malleolar mortise through the anterior and posterior tibio-fibular ligament. The syndesmosis lesions present a diagnostic and therapeutic problem. It is evident that an anatomical reduction is essential for optimal clinical and radiological findings [5]. However, the process of treatment is still controversial. Many debates focused on the identification of instability and the development of several methods which are based on the intensifier screen before and after the reduction, while some authors have demonstrated that the standard radiographic measurements used to assess the integrity of Syndesmosis are inaccurate [5].

In our case, an unusual position of dislocation of the posterior tibialis tendon through syndesmosis is responsible for the intraoperative irreducibility of syndesmosis. The reduction of this tendon should be done

from its pre-tibial vicious position towards its internal anterior retromalleolar pathway by passing through the syndesmosis from front to back.

The fracture of the tillaux tubercle in the adult case is rare [6], it corresponds to an epiphyseal detachment in the child case. During growth, the growth-cartilage welding of the distal end of the tibia progresses from the central part to the medial part and finally to the lateral part. Due to the weakness of the growth plate in relation to the ligaments, The Tillaux fractures are more frequent than the ligament ruptures of the anterior tibiofibular ligament in children [7, 8, 9].

The reported case represents a typical example of the rare lesion association, which includes two pathological entities common in pediatric traumato-orthopedics represented by a tillaux fracture [8] and a bimalleolar fracture in adults, associated with tendon interposition as a result of anterior dislocation of posterior tibialis tendon. There are several classifications of ankle fractures. To be comprehensive, some classifications are so complex that they make their memorization almost impossible. The Lauge-Hansen classification remains the most comprehensive and widespread classification of each type of fracture in two terms. The first term refers to the position of the foot at the time of the trauma; and the second refers to the direction in which the slope moves in the mortise in response to the vulnerable forces. In the case of bimalleolar fractures by lateral pronation-rotation mechanism, we can observe fractures and tearing of the Tillaux tuber (tubercle) [10, 11]. But the association of other lesions must be sought systematically such as: the interposition of posterior tibial tendon or the interposition of the posterior tibial vasculo-nervous packet.

The open focal spot reduction and internal fixation using the principles of the AO technique, as for any other joint fracture, are now the standard treatment for displaced ankle fracture with syndesmosis rupture. The aim of treating an ankle fracture is to obtain an anatomical reduction of the internal articular surface by a rigid internal fixation, in order to allow an early mobilization of the mortise of the ankle, and to obtain an anatomical articulation, which is mobile, painless, and stable. The surgical treatment of this type of fracture, which we present, is not different from that of a classic bimalleolar fracture [12]. The chosen treatment of bimalleolar fractures of the ankle remains a reduction with an open focal spot associated with an internal fixation. In spite of an initial anatomical reduction of the fracture, patients may have permanent pain, secondary to osteoarthritis or insufficient reduction of syndesmosis [13, 14]. The avulsion osteosynthesis of Tillaux tubercle depends on the size of the detached bone fragment. In such case, an internal fixation by a screw is always preferred if the bone fragment is synthesizable, as in the case of our patient whose avulsion has been fixed by a direct screw. In contrary cases in which the fragment is not synthesizable, orthopedic treatment retains its place after satisfactory radiological reduction of syndesmosis.

The interposition of the posterior tibial tendon in the syndesmosis has been identified, in our study, as the cause of subluxation of the lower tibio-fibular mortise; this event is very rare, even reported as one of the rare cases of the literature. [15] The posterior tibial tendon was transferred to its anatomical position and the lower tibio-fibular ligament was appropriately reduced by fixing the syndesmosis by a direct screw.

This lesion combination in our patient made our case particular. Globally and at the last follow-up, our

functional and radiological results were satisfactory after a well-conducted re-education respecting the peculiarities of this articulation of the lower limb.

CONCLUSION

This traumatic lesion combination is exceptional, such an association is never reported in the literature. It is

AUTHORS' CONTRIBUTIONS

The participation of each author corresponds to the criteria of authorship and contributorship emphasized in the [Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly work in Medical Journals](#) of the [International Committee of Medical Journal Editors](#). Indeed, all the authors have actively participated in the redaction, the revision of the

secondary to a high energy trauma. A rapid and adequate management by doing a surgical reduction and an internal fixation of the bimalleolar fracture of the syndesmosis, associated with an anatomical repositioning of the posterior tibial tendon made it possible to obtain satisfied results.

manuscript and provided approval for this final revised version.

PATIENT CONSENT

Written informed consent was obtained from the patient for publication of this case report.

COMPETING INTERESTS

The authors declare no competing interests.

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